

Schizophrenia and oral health: clinical and surgical challenges in the context of cognitive and treatment burden

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Abstract: People with schizophrenia frequently experience cognitive and behavioral impairments that extend beyond psychotic symptoms and strongly influence self-care and health maintenance. Among the neglected consequences of these deficits is poor oral health, which contributes to systemic inflammation, social withdrawal, and reduced quality of life. This narrative review explores how cognitive dysfunction, motivational deficits, and pharmacological factors interact to determine oral health outcomes in schizophrenia. A literature search (2000–2024) in PubMed, Scopus, and Web of Science identified evidence linking executive dysfunction, inattention, and impaired planning with inadequate oral hygiene behaviors and irregular dental attendance. Antipsychotic-induced xerostomia, negative symptoms, and low motivation further exacerbate caries and periodontal disease risk. Integrated interventions combining cognitive remediation, behavioral activation, and coordinated dental follow-up demonstrated potential benefits. Cognitive impairment thus emerges as a key mechanism connecting mental and oral health, underscoring the need for multidisciplinary approaches that align psychiatric treatment with preventive dental care. Recognizing the mind–mouth relationship may improve both functional recovery and psychological wellbeing in individuals with schizophrenia.

Key words: schizophrenia; cognitive impairment; oral health; self-care; wellbeing

1.INTRODUCTION:

Schizophrenia is a severe psychiatric disorder with complex implications for systemic and oral health. Affecting approximately 1% of the adult population worldwide, it is characterized not only by psychotic symptoms but also by persistent cognitive impairment—in domains such as attention, executive functioning, and memory—which deeply influences self-care and the ability to follow medical or surgical recommendations [1,2]. These neurocognitive deficits, compounded by long-term pharmacological treatment, generate a significant

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treatment burden that extends beyond psychiatry and affects the patient's general and oral wellbeing [3].

Oral health has emerged as a critical yet often overlooked aspect of overall care in individuals with schizophrenia. Numerous studies report that these patients have a higher prevalence of caries, periodontal disease, mucosal lesions, and tooth loss, often accompanied by poor hygiene and irregular dental attendance [4,5]. However, the etiology of these oral conditions is multifactorial. Cognitive dysfunction limits the patient's capacity to maintain consistent hygiene routines and adhere to preventive care, while antipsychotic therapy, particularly second-generation agents such as clozapine or olanzapine, contributes to xerostomia, altered salivary composition, metabolic changes, and neuromuscular side effects that exacerbate vulnerability to infection and delayed healing [6,7].

From a surgical and clinical perspective, these systemic and pharmacological alterations carry substantial implications. Impaired wound healing, increased infection risk, and unpredictable responses to anesthesia or analgesia are frequently encountered in patients under chronic psychotropic medication [8]. Cognitive and behavioral instability further complicate perioperative management: difficulty in understanding instructions, anxiety, or erratic cooperation may affect both the safety and efficacy of surgical procedures [9]. Such challenges require modifications in anesthesia selection, intraoperative monitoring, and postoperative care protocols.

The interaction between cognitive dysfunction and treatment burden thus creates a vulnerable profile for oral and maxillofacial health. This dual influence not only increases the likelihood of oral disease but also impairs recovery after extractions, periodontal surgery, or implant placement. Furthermore, psychotropic-anesthetic drug interactions, medication-induced immune suppression, and metabolic alterations amplify perioperative risks [10,11].

Despite growing evidence of these clinical complexities, oral and surgical management in patients with schizophrenia

remains poorly standardized. The lack of integration between psychiatric and dental services often leads to delayed interventions, preventable complications, and diminished quality of life. In this context, understanding oral health within the framework of cognitive and therapeutic challenges is essential for developing safer, evidence-based approaches to surgical and rehabilitative care.

This review aims to synthesize current knowledge on the clinical and surgical implications of schizophrenia in oral health, emphasizing how cognitive deficits and chronic pharmacological exposure influence diagnosis, treatment planning, and postoperative recovery. By framing oral disease and healing outcomes through the lens of cognitive dysfunction and treatment burden, this work seeks to highlight strategies that improve interdisciplinary collaboration, optimize surgical outcomes, and enhance patient wellbeing.

2. LITERATURE REVIEW

✓ 2.1. Cognitive Dysfunction and Clinical Self-Management Limitations

Cognitive impairment represents one of the core and persistent features of schizophrenia, influencing all dimensions of clinical care, including oral and surgical management [12]. The domains most frequently affected—attention, working memory, executive function, and psychomotor coordination—are essential for performing daily hygiene and for following perioperative medical instructions [13]. Patients with schizophrenia often struggle to organize sequential actions such as brushing, rinsing, and medication intake, leading to rapid accumulation of dental plaque and mucosal irritation [14].

Beyond hygiene, these cognitive limitations translate into deficient self-monitoring and poor symptom recognition. Many patients are unable to perceive or correctly interpret early signs of oral or postoperative complications—such as pain,

bleeding, or swelling—resulting in delayed presentation and advanced pathology at the time of surgical consultation [15]. Deficits in insight and illness awareness, which are common even during stable psychiatric phases, further reduce adherence to preventive check-ups and postoperative follow-up [16].

During dental and maxillofacial procedures, cognitive slowing and reduced comprehension affect communication and cooperation, prolonging chair time and increasing intraoperative stress for both patient and clinician. Limited capacity to recall or apply postoperative instructions (e.g., wound hygiene, dietary restrictions, or medication schedules) directly correlates with higher infection rates, premature suture loss, and delayed healing [17].

In addition, cognitive dysfunction interacts with negative symptoms—apathy, lack of motivation, and diminished initiative—creating a state of functional inertia that severely compromises oral self-care. This psychomotor and motivational flattening leads to neglect of both basic hygiene and postoperative wound maintenance [18]. These behaviors are not the result of intentional noncompliance but of neurobiological and executive deficits that restrict adaptive functioning.

For the surgical team, such impairments necessitate modified perioperative strategies. Simplified verbal instructions, repetition, written or pictorial aids, and caregiver reinforcement have proven beneficial in improving postoperative compliance [19]. Structured checklists and short, frequent appointments can compensate for attention deficits and improve continuity of care. The collaboration between psychiatrist, surgeon, and nurse is crucial in assessing cognitive status preoperatively and tailoring postoperative protocols accordingly [20].

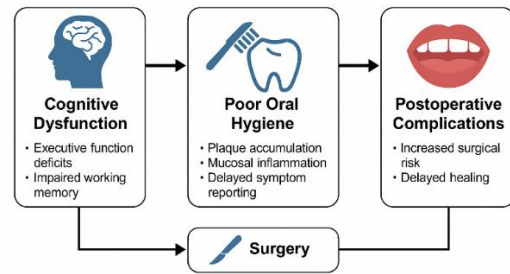


Fig. 1- Clinical impact of cognitive dysfunction on oral and surgical outcomes in schizophrenia.

The Pharmacological Burden: Antipsychotics and Oral-Systemic Effects

Long-term pharmacotherapy remains the cornerstone of schizophrenia management but represents a major determinant of systemic and oral morbidity. Most patients require chronic antipsychotic treatment, often in combination with mood stabilizers, antidepressants, or anticholinergic agents—all of which exert substantial biological effects on the oral cavity and surgical outcomes [21].

The most prominent manifestation is xerostomia, caused by muscarinic receptor blockade and reduced parasympathetic stimulation of salivary glands [22]. Decreased salivary flow and altered viscosity impair the mouth's natural defense system, compromising buffering capacity and mechanical cleansing. The resulting acidic and desiccated environment promotes bacterial proliferation (*Streptococcus mutans*, *Lactobacillus spp.*), dental caries, and mucosal microtrauma, while also delaying soft-tissue healing after extractions or minor oral surgery [23]. In patients receiving clozapine, paradoxical sialorrhea can occur, increasing aspiration risk and complicating airway management during anesthesia [24].

Beyond salivary effects, antipsychotic therapy disrupts metabolic and vascular homeostasis. Second-generation agents—particularly clozapine, olanzapine, and quetiapine—are linked to metabolic syndrome, insulin resistance, and dyslipidemia [25].

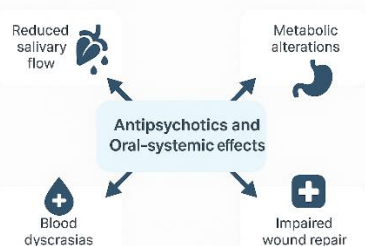


Fig.2- Systemic and oral effects of antipsychotic medications influencing surgical outcomes in schizophrenia.

These systemic alterations impair angiogenesis, collagen synthesis, and immune function, resulting in slower postoperative recovery and a higher incidence of wound dehiscence or infection [26]. Hyperglycemia and obesity also modify the oral microbiome, fostering proinflammatory conditions that exacerbate periodontal breakdown [27].

Several psychotropic drugs carry hematologic side effects relevant to surgical safety. Clozapine-associated agranulocytosis and risperidone-related thrombocytopenia may lead to increased bleeding or infection risk during oral procedures [28]. Routine blood monitoring is therefore essential in preoperative planning. Additionally, antipsychotics interact pharmacodynamically with anesthetic and analgesic agents—enhancing sedative effects, depressing respiratory drive, or potentiating hypotension through alpha-adrenergic blockade [29]. Surgeons and anesthesiologists must coordinate closely with psychiatrists to adjust medication timing, avoid abrupt withdrawal, and ensure hemodynamic stability [30].

A less visible but equally critical issue is the impact of chronic antipsychotic exposure on bone metabolism. Dopamine antagonism and hyperprolactinemia have been associated with decreased bone mineral density and impaired osseointegration, particularly in long-term female patients [31]. This may compromise the success of implant therapy or bone graft integration. Furthermore, medication-induced extrapyramidal effects—such as orofacial dyskinesia or bruxism—can generate excessive mechanical

stress on prosthetic restorations or healing surgical sites [32].

In the broader clinical context, the pharmacological burden of schizophrenia extends to immunologic vulnerability, reduced salivary antimicrobial activity, and heightened systemic inflammation. Collectively, these changes transform even minor surgical interventions into procedures requiring individualized risk assessment. A multidisciplinary approach—encompassing medication review, salivary function evaluation, and perioperative metabolic control—remains essential to optimize healing and minimize complications [33].

Oral and Surgical Complications in Schizophrenia

Patients with schizophrenia frequently present dental and surgical services with advanced oral pathology that reflects years of neglect and multifactorial physiological vulnerability [34]. The most common manifestations include rampant dental caries, chronic periodontitis, mucosal lesions, and partial or total edentulism [35]. These conditions are driven by poor hygiene, xerostomia, dietary imbalance, smoking, and reduced immune competence—all amplified by long-term psychotropic medication.

In surgical contexts, such oral diseases translate into higher intraoperative and postoperative complication rates. Gingival inflammation and poor plaque control increase bacterial load at extraction or incision sites, heightening the risk of alveolitis, delayed socket closure, and secondary infection [36]. In periodontal or implant surgery, tissue regeneration may be compromised by metabolic dysregulation, microvascular alterations, and reduced collagen synthesis associated with antipsychotic-induced hyperglycemia and oxidative stress [37].

Hemostasis can also be affected. Clozapine-related leukopenia and risperidone-associated thrombocytopenia necessitate preoperative hematologic screening to avoid excessive bleeding or impaired immune response [38]. Moreover, smoking—reported in up to 80% of individuals with schizophrenia as an independent risk factor for vasoconstriction,

necrosis, and poor angiogenesis, further delaying healing [39].

Cognitive and behavioral instability compounds these physiological issues. Patients may demonstrate anxiety, paranoia, or disorganized behavior during dental or surgical procedures, often requiring modified approaches to local anesthesia, sedation, or restraint [40]. Excessive salivation or involuntary orofacial movements complicate surgical field control and increase aspiration risk under sedation [41]. Effective management therefore depends on careful preoperative assessment, simplified communication, and reassurance strategies, often requiring the presence of a trained caregiver.

Postoperatively, compliance with analgesic, antibiotic, and hygiene instructions is frequently suboptimal. Many patients forget prescribed doses or discontinue treatment prematurely due to misunderstanding or cognitive overload [42]. As a result, infection rates are significantly higher, and wound dehiscence, suture loss, or alveolar exposure are common [43]. Osseointegration is attempted, osseointegration may be compromised by poor bone density, xerostomia-related mucosal fragility, and metabolic disturbances, necessitating longer healing intervals and enhanced antimicrobial prophylaxis [44].

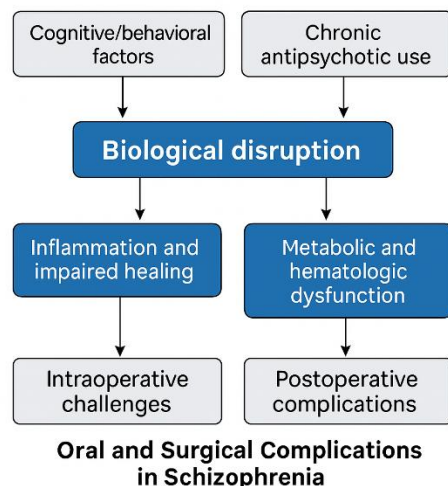


Fig.3- Pathophysiological pathways leading to oral and surgical complications in schizophrenia.

In institutionalized populations, regular follow-up is challenging due to fragmented medical-dental coordination and lack of transport or caregiver continuity. These factors explain why oral surgery in schizophrenia must be treated as a high-risk procedure, even when medically stable.

A multidisciplinary preoperative plan—coordinating psychiatry, anesthesia, and dental surgery—substantially reduces complications. Key elements include blood count evaluation, glycemic control, saliva management, and staged procedures under minimal stress conditions [45].

Ultimately, oral and surgical complications in schizophrenia arise not from isolated negligence but from a convergence of neurocognitive, pharmacological, and biological vulnerabilities. Recognizing these interdependencies enables safer planning, earlier intervention, and a more compassionate, patient-centered approach to surgical care.

Multidisciplinary and Preventive Management Strategies

Optimal management of patients with schizophrenia in oral and surgical settings requires early risk identification and coordinated, multidisciplinary care. Because oral complications arise from an overlap of cognitive, pharmacologic, and systemic factors, no single intervention is sufficient. The integration of psychiatry, oral surgery, and nursing care is essential to achieve safe and predictable outcomes [46].

Preoperative evaluation should include a thorough medical, psychiatric, and pharmacological history, focusing on drug interactions, metabolic status, and hematologic parameters. Collaboration with the treating psychiatrist is crucial to assess cognitive stability and adjust medication timing before anesthesia or surgery [47]. Where feasible, elective interventions should be scheduled during periods of psychiatric stability, under conditions minimizing anxiety and environmental stress [48].

For patients with limited understanding or poor memory, preoperative education must use simplified language, short written instructions, or pictorial guides. The involvement of caregivers is

indispensable for reinforcing perioperative instructions and ensuring postoperative compliance [49]. Such interventions can substantially reduce missed appointments, improve hygiene adherence, and lower the incidence of postoperative complications.

Intraoperatively, the use of shorter, minimally invasive procedures, local anesthesia whenever possible, and anxiety reduction techniques—such as controlled communication or mild conscious sedation—can prevent agitation and ensure safety [50-58]. Surgeons should avoid excessive vasoconstrictors in local anesthetics, given the cardiovascular effects of many antipsychotics, and maintain close hemodynamic monitoring in collaboration with the anesthesiologist [59].

Postoperative care represents the most critical phase. Regular follow-up visits, assisted oral hygiene sessions, and salivary substitutes help prevent infection and delayed healing. Simplified medication regimens, preferably with once-daily dosing, improve compliance in cognitively impaired patients [60]. The use of chlorhexidine mouth rinses, topical antimicrobials, and saliva-stimulating agents can mitigate xerostomia and microbial imbalance associated with antipsychotic therapy [61].

In institutional or community settings, establishing preventive oral health programs is key. These programs may include periodic dental screenings within psychiatric facilities, caregiver training in oral hygiene supervision, and nutritional counseling to limit high-sugar diets common among patients with negative symptoms or medication-induced cravings [62].

Emerging evidence supports the development of integrated clinical pathways—standardized protocols linking psychiatric and dental teams for the management of surgical patients. Such pathways enable early identification of at-risk individuals, coordinated management of medication side effects, and consistent postoperative monitoring [63].

Ultimately, prevention and rehabilitation in this context rely on communication, simplification, and collaboration. The surgeon's awareness of cognitive and pharmacological barriers, combined with psychiatric insight and

nursing support, forms the foundation of effective, humane care. This multidisciplinary framework not only minimizes complications but also improves patient trust, adherence, and overall wellbeing [64].

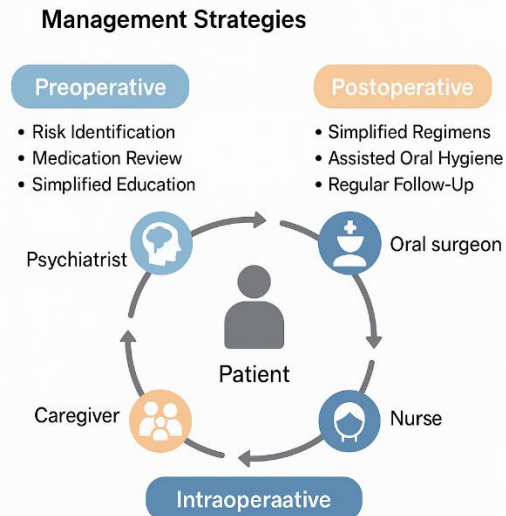


Fig.4- Multidisciplinary and preventive management strategies for oral and surgical care in schizophrenia.

Emerging Directions in Clinical and Surgical Research

Recent advances in translational and digital medicine have opened new avenues for understanding and managing oral health complications in schizophrenia. The intersection of biomechanics, neuropsychiatry, and oral surgery offers opportunities to model disease processes more accurately and to personalize treatment based on patient-specific cognitive and physiological parameters [63].

One promising area involves salivary biomarkers—including inflammatory cytokines (IL-6, TNF- α), oxidative stress mediators, and cortisol levels—that reflect both systemic stress and local wound response. These molecular indicators could serve as non-invasive predictors of delayed healing or infection risk in patients under psychotropic therapy [63]. Salivary proteomics and microbiome sequencing are further revealing how psychiatric medication alters host-microbe dynamics, with implications for postoperative infection control [64].

The integration of finite element modeling (FEM) and 3D digital planning in oral and maxillofacial surgery now enables simulation of bone stress and implant stability in complex psychiatric cases. Such approaches can account for altered bone density, occlusal load, and neuromuscular hyperactivity (e.g., bruxism or dyskinesia), allowing clinicians to optimize implant geometry and surgical angles to reduce postoperative failure [68].

Another frontier lies in artificial intelligence (AI) and remote monitoring. AI-driven image recognition can identify early mucosal changes or carious lesions from intraoral photographs, while wearable biosensors may track salivary pH, hydration, or medication adherence in real time [66]. These technologies hold potential for integrating dental data into psychiatric electronic health records, creating an interdisciplinary framework that bridges mental and oral healthcare [67].

At a systems level, interprofessional education and integrated clinical pathways are critical to sustaining progress. Simulation-based training for surgeons and psychiatrists is being developed to improve perioperative risk assessment, crisis management, and communication in cognitively impaired patients [68]. Meanwhile, multicenter prospective studies are needed to validate standardized surgical protocols and quantify the effects of antipsychotic therapy on tissue regeneration and osseointegration [69].

Looking ahead, the future of oral surgery in schizophrenia lies in precision and prevention—where cognitive assessment, salivary diagnostics, and digital modeling converge to anticipate risk and tailor interventions. The collaboration between mental health and surgical sciences will not only refine technical outcomes but also restore dignity, comfort, and quality of life to one of medicine's most vulnerable populations [70].

3. CONCLUSIONS

Schizophrenia profoundly influences oral and surgical health through a complex interplay of cognitive dysfunction, pharmacological burden, and systemic

alterations. Cognitive impairment compromises self-care, adherence, and postoperative compliance, while chronic antipsychotic therapy induces salivary dysfunction, metabolic imbalance, and hematologic vulnerability. Together, these factors predispose patients to infection, delayed healing, and surgical complications that extend beyond local pathology.

Successful management therefore requires a paradigm shift from procedure-centered to patient-centered surgery, emphasizing prevention, simplification, and interdisciplinary collaboration. Coordination between psychiatrists, oral surgeons, anesthesiologists, and caregivers ensures safer interventions and improved outcomes. Individualized surgical planning, supported by careful medication review and behavioral stabilization, can significantly reduce perioperative risks.

Emerging technologies—such as digital surgical planning, salivary biomarkers, and artificial intelligence—offer new tools to anticipate complications and personalize care. However, their integration must be accompanied by compassionate clinical communication and structured follow-up programs tailored to the cognitive capacities of each patient.

Ultimately, addressing oral health in schizophrenia is not merely a dental or surgical challenge but an ethical and clinical imperative within holistic medicine. Recognizing the bidirectional relationship between mental stability and oral integrity will enable practitioners to restore not only physical function but also dignity, confidence, and wellbeing in this vulnerable population.

Declaration of conflict of interest.

The authors state that there is no conflict of financial or non-financial interests with the data and information presented in the article. The study was approved by the committee of ethics committee.

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